

What is claimed is:

1. A substrate processing apparatus for performing coating and developing processing for a substrate, comprising:

5 a loader/unloader section for carrying the substrate into/out of the substrate processing apparatus;

a processing section having a coating processing unit for at least forming a coating film on the substrate, a developing processing unit for developing the substrate; a thermal processing unit for thermally processing the substrate, and a first transfer device for carrying the substrate into/out of the coating processing unit, the developing processing unit, and the thermal processing unit;

15 an interface section having a second transfer device for transferring the substrate at least via a route between the processing section and an aligner for subjecting the substrate to exposure processing;

20 a first gas supply device for supplying an inert gas to the interface section; and

a first exhaust device for exhausting an atmosphere in the interface section.

25 2. The apparatus as set forth in claim 1, further comprising:

a second gas supply device for supplying the inert gas to an area having at least the thermal processing

unit and the first transfer device in the processing section; and

a second exhaust device for exhausting an atmosphere at least in the area.

5     3.    The apparatus as set forth in claim 1, further comprising:

a third gas supply device for supplying the inert gas to the loader/unloader section; and

10     a third exhaust device for exhausting an atmosphere in the loader/unloader section.

4.    The apparatus as set forth in claim 2, further comprising:

15     a first partition plate shutting off the atmosphere in the interface section from the atmosphere in the processing section and having a first transit opening for delivering the substrate between the area in the processing section and the interface section; and

20     a first shutter allowing the first transit opening to freely open and close.

5.    The apparatus as set forth in claim 4, further comprising:

25     a second partition plate shutting off the atmosphere in the processing section from the atmosphere in the loader/unloader section and having a second transit opening for delivering the substrate between the area in the processing section and the

loader/unloader section; and

a second shutter allowing the second transit opening to freely open and close.

6. The apparatus as set forth in claim 1, further  
5 comprising:

a cleaning mechanism for cleaning at least a part of the atmosphere exhausted by the first exhaust device and sending the same as the inert gas to the gas supply device again.

10 7. The apparatus as set forth in claim 1, further comprising:

a temperature regulating mechanism for regulating a temperature of the inert gas.

8. The apparatus as set forth in claim 1, further  
15 comprising:

a first pressure regulating mechanism for setting a pressure inside the interface section lower than a pressure inside the aligner.

9. The apparatus as set forth in claim 8, further  
20 comprising:

a second pressure regulating mechanism for setting the pressure inside the interface section lower than a pressure inside the area in the processing section.

10. The apparatus as set forth in claim 9, further  
25 comprising:

a third pressure regulating mechanism for setting the pressure inside the area in the processing section

higher than a pressure inside the loader/unloader section.

11. The apparatus as set forth in claim 9, further comprising:

5           a fourth pressure regulating mechanism for setting the pressure inside the area in the processing section lower than pressures inside the coating processing unit and the developing processing unit in the processing section.

10          12. The apparatus as set forth in claim 1, further comprising:

            a fifth pressure regulating mechanism for setting a pressure inside the substrate processing apparatus higher than a pressure outside the substrate processing apparatus.

15          13. A substrate processing apparatus for performing coating and developing processing for a substrate, comprising:

            a processing section having a coating processing unit for at least forming a coating film on the substrate, a developing processing unit for developing the substrate, a thermal processing unit for thermally processing the substrate, and a main transfer device for carrying the substrate into/out of the coating processing unit, the developing processing unit, and

25           the thermal processing unit;  
            an interface section for transferring the

substrate at least via a route between the processing section and an aligner for subjecting the substrate to exposure processing, in which a first thermal processing unit for thermally processing the substrate before exposure, a first transfer device for transferring the substrate before exposure, a second thermal processing unit for thermally processing the substrate after exposure, and a second transfer device for transferring the substrate after exposure are placed;

a first gas supply device for supplying an inert gas to an area before exposure having the first thermal processing unit and the first transfer device in the interface section;

a first exhaust device for exhausting an atmosphere in the area before exposure;

a second gas supply device for supplying the inert gas to an area after exposure having the second thermal processing unit and the second transfer device in the interface section; and

a second exhaust device for exhausting an atmosphere in the area after exposure.

14. The apparatus as set forth in claim 13,

wherein the second gas supply device supplies the inert gas having a temperature lower than a temperature of the inert gas supplied by the first gas supply device.

15. The apparatus as set forth in claim 13,  
wherein the second gas supply device supplies the  
inert gas having a low oxygen concentration.

16. The apparatus as set forth in claim 13, further  
5 comprising:

a first partition plate shutting off the  
atmosphere in the area before exposure from the  
atmosphere in the area after exposure.

17. The apparatus as set forth in claim 13, further  
10 comprising:

a second partition plate shutting off an  
atmosphere in the processing section from an atmosphere  
in the interface section and having a first transit  
opening for delivering the substrate between the  
15 processing section and the area before exposure and a  
second transit opening for delivering the substrate  
between the processing section and the area after  
exposure,

a first shutter allowing the first transit opening  
20 to freely open and close; and

a second shutter allowing the second transit  
opening to freely open and close.

18. The apparatus as set forth in claim 13, further  
comprising:

25 a temperature regulating mechanism for regulating  
a temperature of the inert gas.

19. The apparatus as set forth in claim 13, further

comprising:

a pressure regulating mechanism for setting a pressure inside the interface section lower than a pressure inside the aligner.

5 20. A substrate processing apparatus, comprising:

a processing section for performing coating and developing processing for a substrate;

an interface section for transferring the substrate at least via a route between the processing section and an aligner for subjecting the substrate to exposure processing;

a first gas supply device for supplying an inert gas to the interface section; and

15 a first exhaust device for exhausting an atmosphere in the interface section.

21. A substrate processing apparatus, comprising:

a processing section for performing coating and developing processing for a substrate;

an interface section, for transferring the substrate at least via a route between the processing section and an aligner for subjecting the substrate to exposure processing, divided into a first area for transferring the substrate delivered from the processing section to the aligner and a second area for transferring the substrate delivered from the aligner to the processing section;

25 a first gas supply device for supplying an inert

gas to the first area;

a first exhaust device for exhausting an atmosphere in the first area;

a second gas supply device for supplying the inert  
5 gas to the second area; and

a second exhaust device for exhausting an atmosphere in the second area.

22. A substrate processing apparatus, comprising:

a processing section for performing coating and  
10 developing processing for a substrate;

an interface section for transferring the substrate at least via a route between the processing section and an aligner for subjecting the substrate to exposure processing;

15 a chamber, disposed inside the interface section, for temporarily holding the substrate delivered from the processing section and to be transferred to the aligner; and

an atmosphere controller for controlling an  
20 atmosphere in the chamber.

23. The apparatus as set forth in claim 22,  
wherein the atmosphere controller reduces a pressure inside the chamber.

24. The apparatus as set forth in claim 22,  
25 wherein the atmosphere controller supplies an inert gas into the chamber.

25. The apparatus as set forth in claim 22,



wherein the atmosphere controller supplies dry air into the chamber.

26. The apparatus as set forth in claim 22,  
wherein the chamber comprises:

5       a purge room for temporarily holding and purging  
the substrate introduced into the chamber;  
a buffer room for holding the substrate; and  
a transfer device for transferring the substrate  
between the purge room and the buffer room.

10       27. The apparatus as set forth in claim 26,  
wherein the buffer room has a transit opening for  
directly carrying out the substrate to the aligner.

28.       A substrate processing apparatus, comprising:  
a coating processing unit for at least forming a  
15       coating film on a substrate;

a developing processing unit for developing the  
substrate;

a thermal processing unit for thermally processing  
the substrate;

20       a transfer device for carrying the substrate  
into/out of the coating processing unit, the developing  
processing unit, and the thermal processing unit; and

a blower for sending an inert gas to the substrate  
which is being transferred by the transfer device.

25       29. The apparatus as set forth in claim 28,

wherein the transfer device has tweezers for  
holding the substrate, and

wherein the blower has a top cover having a blast port for sending the inert gas from above the tweezers.

30. The apparatus as set forth in claim 29,

wherein a plurality of the blast ports are  
5 provided to correspond to a shape of the tweezers.

31. The apparatus as set forth in claim 29,

wherein a plurality of the blast ports are provided to correspond to a shape of the substrate.

32. The apparatus as set forth in claim 28,

10 wherein the blower has a temperature control mechanism for controlling a temperature of the inert gas.

33. The apparatus as set forth in claim 28,

wherein the blower has a humidity control  
15 mechanism for controlling a humidity of the inert gas.

34. The apparatus as set forth in claim 28,

wherein the blower sends the inert gas when the transfer device transfers the substrate from the coating processing unit to the thermal processing unit.

20 35. A substrate processing apparatus, comprising:

a reaction inhibiting section for performing processing of inhibiting progress of a resolution reaction of a resist for a substrate coated with the resist and exposed;

25 a heating section for heating the substrate processed in the reaction inhibiting section to progress the resolution reaction of the resist;

a cooling section for cooling the substrate heated in the heating section to inhibit the progress of the resolution reaction of the resist; and

5 a developing processing section for performing coating processing of a developing solution for the substrate cooled in the cooling section.

36. A substrate processing apparatus, comprising:

10 a cassette station including a mounting section on which a substrate cassette housing a plurality of substrates is mounted and a delivery means for receiving and sending the substrate from/to the substrate cassette mounted on the mounting section;

15 a processing station, connected to the cassette station, for processing the substrate transferred by the delivery means; and

an interface station for delivering the substrate between the processing station and an aligner for subjecting the substrate to exposure processing,

20 wherein the interface station includes a reaction inhibiting section for performing processing of inhibiting progress of a resolution reaction of a resist for a substrate coated with the resist and exposed, and

25 wherein the processing station includes a heating section for heating the substrate processed in the reaction inhibiting section to progress the resolution reaction of the resist, a cooling section for cooling

the substrate heated in the heating section to inhibit the progress of the resolution reaction of the resist, and a developing processing section for performing coating processing of a developing solution for the substrate.

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37. The apparatus as set forth in claim 36,  
wherein the reaction inhibiting section is placed near the aligner.

38. The apparatus as set forth in claim 35,  
wherein the reaction inhibiting section inhibits the progress of the resolution reaction of the resist by cooling the substrate coated with the resist and exposed so as not to cause dew formation.

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39. The apparatus as set forth in claim 35,  
wherein the reaction inhibiting section inhibits the progress of the resolution reaction of the resist by making an amount of moisture adhering to the substrate coated with the resist and exposed smaller than an amount of moisture adhering to the substrate when the substrate is transferred to the reaction inhibiting section.

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40. The apparatus as set forth in claim 39,  
wherein the reaction inhibiting section makes the amount of the moisture adhering to the substrate smaller than the amount of the moisture adhering to the substrate when the substrate is transferred to the reaction inhibiting section by supplying a gas having a

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humidity lower than a humidity of air in an atmosphere in which the reaction inhibiting section is placed.

41. The apparatus as set forth in claim 35,

wherein the resist is a chemically amplified  
5 resist, the resolution reaction of which is progressed by an acid produced by exposure.

42. The apparatus as set forth in claim 35,

wherein the reaction inhibiting section controls an extent to which the progress of the resolution  
10 reaction of the resist is inhibited according to an area of the substrate coated with the resist and exposed.

43. A substrate processing method, comprising the steps of:

15 performing processing of inhibiting progress of a resolution reaction of a resist for a substrate coated with a resist and exposed;

heating the substrate subjected to the processing of inhibiting the progress of the resolution reaction  
20 of the resist to progress the resolution reaction of the resist;

cooling the heated substrate to inhibit the progress of the resolution reaction of the resist; and  
performing coating processing of a developing  
25 solution for the cooled substrate.

44. The method as set forth in claim 43,

wherein in the reaction inhibiting step, by

cooling the substrate coated with the resist and exposed so as not to cause dew formation, the progress of the resolution reaction of the resist is inhibited.

45. The method as set forth in claim 43,

5            wherein in the reaction inhibiting step, the progress of the resolution reaction of the resist is inhibited by making an amount of moisture adhering to the substrate coated with the resist and exposed smaller than an amount of moisture adhering to the substrate when the substrate is transferred in the reaction inhibiting step.

46. The method as set forth in claim 43,

             wherein in the reaction inhibiting step, an amount of moisture adhering to the substrate is made smaller than an amount of moisture adhering to the substrate when the substrate is transferred in the reaction inhibiting step by supplying a gas having a humidity lower than a humidity of air in an atmosphere in the reaction inhibiting step.

20           47. The method as set forth in claim 43,

             wherein the resist is a chemically amplified resist, the resolution reaction of which is progressed by an acid produced by exposure.

48. A substrate processing method, comprising the steps of:

             coating a substrate with a resist;

             transferring the substrate coated with the resist

and exposed to a heating section while inhibiting a resolution reaction of the resist;

heating the transferred substrate in the heating section to progress the resolution reaction of the resist;

cooling the substrate on which the resolution reaction is progressed to inhibit the progress of the resolution reaction of the resist; and

performing coating processing of a developing solution for the substrate on which the progress of the resolution reaction is inhibited.

49. The method as set forth in claim 48,

wherein in the transferring step, the exposed substrate is transferred to the heating section while the progress of the resolution reaction of the resist is inhibited by cooling the exposed substrate so as not to cause dew formation.

50. The method as set forth in claim 48,

wherein in the transferring step, the substrate is transferred to the heating section while the progress of the resolution reaction of the resist is inhibited by making an amount of moisture adhering to the substrate when the substrate is transferred to the heating section smaller than an amount of moisture adhering to the substrate after exposure.

51. The method as set forth in claim 50,

wherein in the transferring step, the amount of

the moisture adhering to the substrate when the substrate is transferred to the heating section is made smaller than the amount of the moisture adhering to the substrate after exposure by transferring the substrate to the heating section while supplying a gas having a lower humidity than air to the exposed substrate.

52. The method as set forth in claim 48,  
wherein the resist is a chemically amplified resist, the resolution reaction of which is progressed by an acid produced by exposure.

53. A substrate processing apparatus, comprising:  
a heating section for heating a substrate exposed in an exposure section for exposing the substrate coated with a resist to progress a resolution reaction of the resist;

a transfer section for transferring at least the exposed substrate to the heating section with the resolution reaction of the resist being inhibited;

a cooling section for cooling the heated substrate to inhibit the progress of the resolution reaction of the resist; and

a developing processing section for performing coating processing of a developing solution for the cooled substrate.

54. The apparatus as set forth in claim 53,  
wherein a cooling section cools a transfer area of the substrate between the exposure section and the



heating section so as not to cause dew formation to inhibit the resolution reaction of the resist.

55. The apparatus as set forth in claim 53, further comprising:

5           a gas supply section for supplying a gas having a humidity lower than air to a transfer area of the substrate between the exposure section and the heating section to make an amount of moisture adhering to the substrate when the substrate is transferred to the heating section smaller than an amount of moisture  
10           adhering to the substrate after exposure.

56. A substrate processing apparatus, comprising:

          a cassette station including a mounting section on which a substrate cassette housing a plurality of  
15           substrates is mounted and a delivery means for receiving and sending the substrate from/to the substrate cassette mounted on the mounting section;

          a processing station, connected to the cassette station, for processing the substrate transferred by  
20           the delivery means; and

          an interface station for delivering the substrate between the processing station and an aligner for subjecting the substrate to exposure processing,

          wherein the processing station comprises;

25           a heating section for heating the exposed substrate to progress a resolution reaction of a resist;

a cooling section for cooling the substrate heated in the heating section to inhibit the progress of the resolution reaction of the resist; and

5 a developing processing section for performing coating processing of a developing solution for the substrate, and

wherein the interface station is cooled so as not to cause dew formation on the substrate to inhibit the resolution reaction of the resist.

10 57. A substrate processing apparatus, comprising:

a cassette station including a mounting section on which a substrate cassette housing a plurality of substrates is mounted and a delivery means for receiving and sending the substrate from/to the substrate cassette mounted on the mounting section;

15 a processing station, connected to the cassette station, for processing the substrate transferred by the delivery means; and

an interface station for delivering the substrate between the processing station and an aligner for subjecting the substrate to exposure processing,

20 wherein the interface station comprises a heating section for heating the exposed substrate to progress a resolution reaction of a resist,

25 wherein the processing station comprises:

a cooling section for cooling the substrate heated in the heating section to inhibit the progress of the

resolution reaction of the resist; and

a developing processing section for performing coating processing of a developing solution for the substrate, and

5            wherein the interface station is cooled so as not to cause dew formation on the substrate to inhibit the resolution reaction of the resist.

58. The apparatus as set forth in claim 56, further comprising:

10           a gas supply section for supplying a gas having a humidity lower than air to the interface station to make an amount of moisture adhering to the substrate when the substrate is transferred to the heating section smaller than an amount of moisture adhering to  
15           the substrate after exposure.

59. The apparatus as set forth in claim 53, further comprising:

            a gas supply section for supplying a gas the temperature and/or humidity of which is regulated to a  
20           face to be processed of the substrate while the substrate is transferred from the exposure section to the heating section by the transfer section.

60. The apparatus as set forth in claim 59, further comprising:

25           a temperature regulating section for regulating at least either of the temperature or the humidity of the gas supplied from the gas supply section to the face to

be processed of the substrate to inhibit the progress  
of the resolution reaction of the resist.

61. The apparatus as set forth in claim 53,

wherein the resist is a chemically amplified  
5 resist, the resolution reaction of which is progressed  
by an acid produced by exposure.